

SEQUENCE LISTING

<110> RIKEN

<110> JAPAN SCIENCE AND TECHNOLOGY AGENCY

<120> A fluorescent indicator using FRET

<130> A41654A

<160> 46

<210> 1

<211> 26

<212> PRT

<213> animal

<400> 1

Lys Arg Arg Trp Lys Lys Asn Phe Ile Ala Val Ser Ala Ala Asn Arg

1 5 10 15

Phe Lys Lys Ile Ser Ser Ser Gly Ala Leu

20 25

<210> 2

<211> 20

<212> PRT

<213> animal

<400> 2

Ala Arg Arg Lys Trp Gln Lys Thr Gly His Ala Val Arg Ala Ile Gly

1 5 10 15

Arg Leu Ser Ser

20

<210> 3

<211> 20

<212> PRT

<213> animal

<400> 3

Ala Arg Arg Lys Leu Lys Gly Ala Ile Leu Thr Thr Met Leu Ala Thr

1 5 10 15

Arg Asn Phe Ser

20

<210> 4

<211> 17

<212> PRT

<213> animal

<400> 4

Gly Val Arg Asn Ile Lys Ser Met Trp Glu Lys Gly Asn Val Phe Ser

1 5 10 15

Ser

<210> 5

<211> 20

<212> PRT

<213> animal

<400> 5

Ala Arg Arg Lys Leu Lys Ala Ala Val Lys Ala Val Val Ala Ser Ser

1 5 10 15

Arg Leu Gly Ser

20

<210> 6

<211> 26

<212> PRT

<213> animal

<400> 6

Phe Met Asn Asn Trp Glu Val Tyr Lys Leu Leu Ala His Ile Arg Pro

1 5 10 15

Pro Ala Pro Lys Ser Gly Ser Tyr Thr Val

20 25

<210> 7

<211> 24

<212> PRT

<213> animal

<400> 7

Ala Arg Lys Glu Val Ile Arg Asn Lys Ile Arg Ala Ile Gly Lys Met

1 5 10 15

Ala Arg Val Phe Ser Val Leu Arg

20

<210> 8

<211> 26

<212> PRT

<213> animal

<400> 8

Leu Arg Arg Leu Ile Asp Ala Tyr Ala Phe Arg Ile Tyr Gly His Trp

1 5 10 15

Val Lys Lys Gly Gln Gln Gln Asn Arg Gly

20 25

<210> 9

<211> 27

<212> PRT

<213> animal

<400> 9

Arg Gly Lys Phe Lys Val Ile Cys Leu Thr Val Leu Ala Ser Val Arg

1 5 10 15

Ile Tyr Tyr Gln Tyr Arg Arg Val Lys Pro Gly

20 25

<210> 10

<211> 28

<212> PRT

<213> animal

<400> 10

Leu Arg Arg Gly Gln Ile Leu Trp Phe Arg Gly Leu Asn Arg Ile Gln

1 5 10 15

Thr Gln Ile Lys Val Val Asn Ala Phe Ser Ser Ser

20 25

<210> 11

<211> 21

<212> PRT

<213> animal

<400> 11

Arg Arg Lys His Leu Gln Arg Pro Ile Phe Arg Leu Arg Cys Leu Val

1 5 10 15

Lys Gln Leu Glu Lys

20

<210> 12

<211> 21

<212> PRT

<213> animal

<400> 12

Thr Glu Lys Met Trp Gln Arg Leu Lys Gly Ile Leu Arg Cys Leu Val

1 5 10 15

Lys Gln Leu Glu Lys

20

<210> 13

<211> 23

<212> PRT

<213> animal

<400> 13

Lys Arg Arg Ala Ile Gly Phe Lys Lys Leu Ala Glu Ala Val Lys Phe

1 5 10 15

Ser Ala Lys Leu Met Gly Gln

20

<210> 14

<211> 28

<212> PRT

<213> animal

<400> 14

Ile Lys Pro Ala Lys Arg Met Lys Phe Lys Thr Val Cys Tyr Leu Leu

1 5 10 15

Val Gln Leu Met His Cys Arg Lys Met Phe Lys Ala

20

25

<210> 15

<211> 22

<212> PRT

<213> animal

<400> 15

Ala Cys Ile Asp Leu Leu Trp Lys Ile Ala Arg Ala Gly Ala Arg Ser

1 5 10 15

Ala Val Gly Thr Glu Ala

20

<210> 16

<211> 27

<212> PRT

<213> animal

<400> 16

Lys Ala His Lys Ala Ala Thr Lys Ile Gln Ala Ser Phe Arg Gly His

1 5 10 15

Ile Thr Arg Lys Lys Leu Lys Gly Glu Lys Lys

20 25

<210> 17

<211> 24

<212> PRT

<213> animal

<400> 17

Lys Thr Ala Ser Pro Trp Lys Ser Ala Arg Leu Met Val His Thr Val

1 5 10 15

Ala Thr Phe Asn Ser Ile Lys Glu

20

<210> 18

<211> 25

<212> PRT

<213> animal

<400> 18

Lys Lys Lys Lys Lys Arg Phe Ser Phe Lys Lys Ser Phe Lys Leu Ser

1 5 10 15

Gly Phe Ser Phe Lys Lys Ser Lys Lys

20 25

<210> 19

<211> 24

<212> PRT

<213> animal

<400> 19

Lys Lys Lys Lys Lys Phe Ser Phe Lys Lys Pro Phe Lys Leu Ser Gly

1 5 10 15

Leu Ser Phe Lys Arg Asn Arg Lys

20

<210> 20

<211> 31

<212> PRT

<213> animal

<400> 20

Lys Gln Gln Lys Glu Lys Thr Arg Trp Leu Asn Thr Pro Asn Thr Tyr

1 5 10 15

Leu Arg Val Asn Val Ala Asp Glu Val Gln Arg Asn Met Gly Ser

20 25 30

<210> 21

<211> 21

<212> PRT

<213> animal

<400> 21

Lys Asp Gln Val Ala Asn Ser Ala Phe Gln Glu Arg Leu Arg Lys His

1 5 10 15

Gly Leu Glu Val Ile

20

<210> 22

<211> 21

<212> PRT

<213> animal

<400> 22

Tyr His Arg Leu Arg Asp Leu Leu Leu Ile Val Lys Arg Ile Val Glu

1 5 10 15

Leu Leu Gly Arg Arg

20

<210> 23

<211> 23

<212> PRT

<213> animal

<400> 23

Gln Gln Leu Ala Thr Leu Ile Gln Lys Thr Tyr Arg Gly Trp Arg Cys

1 5 10 15

Arg Thr His Tyr Gln Leu Met

20

<210> 24

<211> 24

<212> PRT

<213> animal

<400> 24

Arg Ala Ala Cys Ile Arg Ile Gln Lys Thr Ile Arg Gly Trp Leu Leu

1 5 10 15

Arg Lys Arg Tyr Leu Cys Met Gln

20

<210> 25

<211> 12

<212> PRT

<213> animal

<400> 25

Ile Asn Leu Lys Ala Ala Leu Ala Lys Lys Ile Leu

1 5 10

<210> 26

<211> 26

<212> PRT

<213> animal

<400> 26

Gly Ile Gly Ala Val Leu Lys Val Leu Thr Thr Gly Leu Pro Ala Leu

1 5 10 15

Ile Ser Trp Ile Lys Arg Lys Arg Gln Gln

20 25

<210> 27

<211> 30

<212> PRT

<213> animal

<400> 27

His Ser Gln Gly Thr Phe Thr Thr Ser Asp Tyr Ser Lys Tyr Leu Asp

1	5	10	15										
Ser	Arg	Arg	Ala	Gln	Asp	Phe	Val	Gln	Trp	Leu	Met	Asn	Thr
	20		25		30								

<210> 28

<211> 27

<212> PRT

<213> animal

<400> 28

His Ser Asp Gly Thr Phe Thr Ser Glu Leu Ser Arg Leu Arg Asp Ser

1	5	10	15							
Ala	Arg	Leu	Gln	Arg	Leu	Leu	Gln	Gly	Leu	Val
	20		25							

<210> 29

<211> 28

<212> PRT

<213> animal

<400> 29

His Ser Asp Ala Val Phe Thr Asp Asn Tyr Thr Arg Leu Arg Lys Gln

1	5	10	15								
Met	Ala	Val	Lys	Lys	Tyr	Leu	Asn	Ser	Ile	Leu	Asn
	20		25								

<210> 30

<211> 33

<212> PRT

<213> animal

<400> 20

Tyr Ala Asp Gly Thr Phe Ile Ser Asp Tyr Ser Ala Ile Met Asn Lys

1 5 10 15

Ile Arg Gln Gln Asp Phe Val Asn Trp Leu Leu Ala Gln Gln Gln Lys

20 25 30

Ser

<210> 31

<211> 17

<212> PRT

<213> animal

<400> 31

Lys Leu Trp Lys Lys Leu Leu Lys Leu Leu Lys Lys Leu Leu Lys Leu

1 5 10 15

Gly

<210> 32

<211> 5

<212> PRT

<213> eucaryotic cell

<400> 32

Lys Lys Lys Arg Lys

5

<210> 33

<211> 26

<212> PRT

<213> eucaryotic cell

<400> 33

Met Leu Arg Thr Ser Ser Leu Phe Thr Arg Arg Val Gln Pro Ser Leu

1 5 10 15

Phe Arg Asn Ile Leu Arg Leu Gln Ser Thr

20 25

<210> 34

<211> 4

<212> PRT

<213> eucaryotic cell

<400> 34

Lys Asp Glu Leu

<210> 35

<211> 3

<212> PRT

<213> eucaryotic cell

<400> 35

Ser Lys Leu

<210> 36

<211> 4

<212> PRT

<213> eucaryotic cell

<220>

<222> (4)

<223> any amino acid

<400> 36

Cys Ala Ala Xaa

<210> 37

<211> 2

<212> PRT

<213> eucaryotic cell

<400> 37

Cys Cys

<210> 38

<211> 3

<212> PRT

<213> eucaryotic cell

<220>

<222> (2)

<223> any amino acid

<400> 38

Cys Xaa Cys

<210> 39

<211> 4

<212> PRT

<213> eucaryotic cell

<220>

<222> (3), (4)

<223> any amino acid

<400> 39

Cys Cys Xaa Xaa

<210> 40

<211> 16

<212> PRT

<213> Artificial Sequence

<400> 40

Gly Thr Gly Gly Ser Gly Gly Gly Thr Gly Gly Ser Gly Gly Gly Thr
1 5 10 15

<210> 41

<211> 647

<212> PRT

<213> Artificial Sequence

<400> 41

Met Val Ser Lys Gly Glu Glu Leu Phe Thr Gly Val Val Pro Ile Leu
1 5 10 15

Val Glu Leu Asp Gly Asp Val Asn Gly His Arg Phe Ser Val Ser Gly
20 25 30

Glu Gly Glu Gly Asp Ala Thr Tyr Gly Lys Leu Thr Leu Lys Phe Ile
35 40 45

Cys Thr Thr Gly Lys Leu Pro Val Pro Trp Pro Thr Leu Val Thr Thr
50 55 60

Leu Thr Trp Gly Val Gln Cys Phe Ser Arg Tyr Pro Asp His Met Lys
65 70 75 80

Gln His Asp Phe Phe Lys Ser Ala Met Pro Glu Gly Tyr Val Gln Glu
85 90 95

Arg Thr Ile Phe Phe Lys Asp Asp Gly Asn Tyr Lys Thr Arg Ala Glu

100	105	110
Val Lys Phe Glu Gly Asp Thr Leu Val Asn Arg Ile Glu Leu Lys Gly		
115	120	125
Ile Asp Phe Lys Glu Asp Gly Asn Ile Leu Gly His Lys Leu Glu Tyr		
130	135	140
Asn Tyr Ile Ser His Asn Val Tyr Ile Thr Ala Asp Lys Gln Lys Asn		
145	150	155
Gly Ile Lys Ala Asn Phe Lys Ile Arg His Asn Ile Glu Asp Gly Ser		
165	170	175
Val Gln Leu Ala Asp His Tyr Gln Gln Asn Thr Pro Ile Gly Asp Gly		
180	185	190
Pro Val Leu Leu Pro Asp Asn His Tyr Leu Ser Thr Gln Ser Ala Leu		
195	200	205
Ser Lys Asp Pro Lys Glu Lys Arg Asp His Met Val Leu Leu Glu Phe		
210	215	220
Val Thr Ala Ala Arg Met His Asp Gln Leu Thr Glu Glu Gln Ile Ala		
225	230	235
Glu Phe Lys Glu Ala Phe Ser Leu Phe Asp Lys Asp Gly Asp Gly Thr		
245	250	255
Ile Thr Thr Lys Glu Leu Gly Thr Val Met Arg Ser Leu Gly Gln Asn		
260	265	270
Pro Thr Glu Ala Glu Leu Gln Asp Met Ile Asn Glu Val Asp Ala Asp		
275	280	285
Gly Asn Gly Thr Ile Tyr Phe Pro Glu Phe Leu Thr Met Met Ala Arg		
290	295	300
Lys Met Lys Asp Thr Asp Ser Glu Glu Glu Ile Arg Glu Ala Phe Arg		
305	310	315
		320

Val Phe Asp Lys Asp Gly Asn Gly Tyr Ile Ser Ala Ala Gln Leu Arg			
	325	330	335
His Val Met Thr Asn Leu Gly Glu Lys Leu Thr Asp Glu Glu Val Asp			
	340	345	350
Glu Met Ile Arg Glu Ala Asp Ile Asp Gly Asp Gly Gln Val Asn Tyr			
	355	360	365
Glu Glu Phe Val Gln Met Met Thr Ala Lys Gly Gly Lys Arg Arg Trp			
	370	375	380
Lys Lys Asn Phe Ile Ala Val Ser Ala Ala Asn Arg Phe Lys Lys Ile			
385	390	395	400
Ser Ser Ser Gly Ala Leu Glu Leu Met Val Ser Lys Gly Glu Glu Leu			
	405	410	415
Phe Thr Gly Val Val Pro Ile Leu Val Glu Leu Asp Gly Asp Val Asn			
	420	425	430
Gly His Lys Phe Ser Val Ser Gly Glu Gly Glu Gly Asp Ala Thr Tyr			
	435	440	445
Gly Lys Leu Thr Leu Lys Leu Ile Cys Thr Thr Gly Lys Leu Pro Val			
	450	455	460
Pro Trp Pro Thr Leu Val Thr Thr Leu Gly Tyr Gly Leu Gln Cys Phe			
465	470	475	480
Ala Arg Tyr Pro Asp His Met Lys Gln His Asp Phe Phe Lys Ser Ala			
	485	490	495
Met Pro Glu Gly Tyr Val Gln Glu Arg Thr Ile Phe Phe Lys Asp Asp			
	500	505	510
Gly Asn Tyr Lys Thr Arg Ala Glu Val Lys Phe Glu Gly Asp Thr Leu			
	515	520	525
Val Asn Arg Ile Glu Leu Lys Gly Ile Asp Phe Lys Glu Asp Gly Asn			

530	535	540	
Ile Leu Gly His Lys Leu Glu Tyr Asn Tyr Asn Ser His Asn Val Tyr			
545	550	555	560
Ile Thr Ala Asp Lys Gln Lys Asn Gly Ile Lys Ala Asn Phe Lys Ile			
	565	570	575
Arg His Asn Ile Glu Asp Gly Gly Val Gln Leu Ala Asp His Tyr Gln			
	580	585	590
Gln Asn Thr Pro Ile Gly Asp Gly Pro Val Leu Leu Pro Asp Asn His			
	595	600	605
Tyr Leu Ser Tyr Gln Ser Ala Leu Ser Lys Asp Pro Asn Glu Lys Arg			
610	615	620	
Asp His Met Val Leu Leu Glu Phe Val Thr Ala Ala Gly Ile Thr Leu			
625	630	635	640
Gly Met Asp Glu Leu Tyr Lys			

645

<210> 42

<211> 653

<212> PRT

<213> Artificial Sequence

<400> 42

Met Val Ser Lys Gly Glu Glu Leu Phe Thr Gly Val Val Pro Ile Leu			
1	5	10	15
Val Glu Leu Asp Gly Asp Val Asn Gly His Arg Phe Ser Val Ser Gly			
20	25	30	
Glu Gly Glu Gly Asp Ala Thr Tyr Gly Lys Leu Thr Leu Lys Phe Ile			
35	40	45	
Cys Thr Thr Gly Lys Leu Pro Val Pro Trp Pro Thr Leu Val Thr Thr			

50	55	60
Leu Thr Trp Gly Val Gln Cys Phe Ser Arg Tyr Pro Asp His Met Lys		
65	70	75
Gln His Asp Phe Phe Lys Ser Ala Met Pro Glu Gly Tyr Val Gln Glu		80
	85	90
Arg Thr Ile Phe Phe Lys Asp Asp Gly Asn Tyr Lys Thr Arg Ala Glu		95
	100	105
Val Lys Phe Glu Gly Asp Thr Leu Val Asn Arg Ile Glu Leu Lys Gly		110
	115	120
Ile Asp Phe Lys Glu Asp Gly Asn Ile Leu Gly His Lys Leu Glu Tyr		125
	130	135
Asn Tyr Ile Ser His Asn Val Tyr Ile Thr Ala Asp Lys Gln Lys Asn		140
145	150	155
Gly Ile Lys Ala Asn Phe Lys Ile Arg His Asn Ile Glu Asp Gly Ser		160
	165	170
Val Gln Leu Ala Asp His Tyr Gln Gln Asn Thr Pro Ile Gly Asp Gly		175
	180	185
Pro Val Leu Leu Pro Asp Asn His Tyr Leu Ser Thr Gln Ser Ala Leu		190
	195	200
Ser Lys Asp Pro Lys Glu Lys Arg Asp His Met Val Leu Leu Glu Phe		205
	210	215
Val Thr Ala Ala Arg Met His Asp Gln Leu Thr Glu Glu Gln Ile Ala		220
225	230	235
Glu Phe Lys Glu Ala Phe Ser Leu Phe Asp Lys Asp Gly Asp Gly Thr		240
	245	250
Ile Thr Thr Lys Glu Leu Gly Thr Val Met Arg Ser Leu Gly Gln Asn		255
	260	265
		270

Pro Thr Glu Ala Glu Leu Gln Asp Met Ile Asn Glu Val Asp Ala Asp			
275	280	285	
Gly Asn Gly Thr Ile Tyr Phe Pro Glu Phe Leu Thr Met Met Ala Arg			
290	295	300	
Lys Met Lys Asp Thr Asp Ser Glu Glu Glu Ile Arg Glu Ala Phe Arg			
305	310	315	320
Val Phe Asp Lys Asp Gly Asn Gly Tyr Ile Ser Ala Ala Gln Leu Arg			
325	330	335	
His Val Met Thr Asn Leu Gly Glu Lys Leu Thr Asp Glu Glu Val Asp			
340	345	350	
Glu Met Ile Arg Glu Ala Asp Ile Asp Gly Asp Gly Gln Val Asn Tyr			
355	360	365	
Glu Glu Phe Val Gln Met Met Thr Ala Lys Gly Gly Lys Arg Arg Trp			
370	375	380	
Lys Lys Asn Phe Ile Ala Val Ser Ala Ala Asn Arg Phe Lys Lys Ile			
385	390	395	400
Ser Ser Ser Gly Ala Leu Glu Leu Met Thr Gly Lys Leu Pro Val Pro			
405	410	415	
Trp Pro Thr Leu Val Thr Thr Leu Gly Tyr Gly Leu Gln Cys Phe Ala			
420	425	430	
Arg Tyr Pro Asp His Met Lys Gln His Asp Phe Phe Lys Ser Ala Met			
435	440	445	
Pro Glu Gly Tyr Val Gln Glu Arg Thr Ile Phe Phe Lys Asp Asp Gly			
450	455	460	
Asn Tyr Lys Thr Arg Ala Glu Val Lys Phe Glu Gly Asp Thr Leu Val			
465	470	475	480
Asn Arg Ile Glu Leu Lys Gly Ile Asp Phe Lys Glu Asp Gly Asn Ile			

	485		490		495
Leu Gly His Lys Leu Glu Tyr Asn Tyr Asn Ser His Asn Val Tyr Ile					
	500		505		510
Thr Ala Asp Lys Gln Lys Asn Gly Ile Lys Ala Asn Phe Lys Ile Arg					
	515		520		525
His Asn Ile Glu Asp Gly Gly Val Gln Leu Ala Asp His Tyr Gln Gln					
	530		535		540
Asn Thr Pro Ile Gly Asp Gly Pro Val Leu Leu Pro Asp Asn His Tyr					
545		550		550	560
Leu Ser Tyr Gln Ser Ala Leu Ser Lys Asp Pro Asn Glu Lys Arg Asp					
	565		570		575
His Met Val Leu Leu Glu Phe Val Thr Ala Ala Gly Ile Thr Leu Gly					
	580		585		590
Met Asp Glu Leu Tyr Lys Gly Gly Ser Gly Gly Met Val Ser Lys Gly					
	595		600		605
Glu Glu Leu Phe Thr Gly Val Val Pro Ile Leu Val Glu Leu Asp Gly					
	610		615		620
Asp Val Asn Gly His Lys Phe Ser Val Ser Gly Glu Gly Glu Gly Asp					
625		630		635	640
Ala Thr Tyr Gly Lys Leu Thr Leu Lys Leu Ile Cys Thr					
	645		650		

<210> 43

<211> 653

<212> PRT

<213> Artificial Sequence

<400> 43

Met Val Ser Lys Gly Glu Glu Leu Phe Thr Gly Val Val Pro Ile Leu

1	5	10	15
Val Glu Leu Asp Gly Asp Val Asn Gly His Arg Phe Ser Val Ser Gly			
20	25	30	
Glu Gly Glu Gly Asp Ala Thr Tyr Gly Lys Leu Thr Leu Lys Phe Ile			
35	40	45	
Cys Thr Thr Gly Lys Leu Pro Val Pro Trp Pro Thr Leu Val Thr Thr			
50	55	60	
Leu Thr Trp Gly Val Gln Cys Phe Ser Arg Tyr Pro Asp His Met Lys			
65	70	75	80
Gln His Asp Phe Phe Lys Ser Ala Met Pro Glu Gly Tyr Val Gln Glu			
85	90	95	
Arg Thr Ile Phe Phe Lys Asp Asp Gly Asn Tyr Lys Thr Arg Ala Glu			
100	105	110	
Val Lys Phe Glu Gly Asp Thr Leu Val Asn Arg Ile Glu Leu Lys Gly			
115	120	125	
Ile Asp Phe Lys Glu Asp Gly Asn Ile Leu Gly His Lys Leu Glu Tyr			
130	135	140	
Asn Tyr Ile Ser His Asn Val Tyr Ile Thr Ala Asp Lys Gln Lys Asn			
145	150	155	160
Gly Ile Lys Ala Asn Phe Lys Ile Arg His Asn Ile Glu Asp Gly Ser			
165	170	175	
Val Gln Leu Ala Asp His Tyr Gln Gln Asn Thr Pro Ile Gly Asp Gly			
180	185	190	
Pro Val Leu Leu Pro Asp Asn His Tyr Leu Ser Thr Gln Ser Ala Leu			
195	200	205	
Ser Lys Asp Pro Lys Glu Lys Arg Asp His Met Val Leu Leu Glu Phe			
210	215	220	

Val Thr Ala Ala Arg Met His Asp Gln Leu Thr Glu Glu Gln Ile Ala			
225	230	235	240
Glu Phe Lys Glu Ala Phe Ser Leu Phe Asp Lys Asp Gly Asp Gly Thr			
	245	250	255
Ile Thr Thr Lys Glu Leu Gly Thr Val Met Arg Ser Leu Gly Gln Asn			
	260	265	270
Pro Thr Glu Ala Glu Leu Gln Asp Met Ile Asn Glu Val Asp Ala Asp			
	275	280	285
Gly Asn Gly Thr Ile Tyr Phe Pro Glu Phe Leu Thr Met Met Ala Arg			
	290	295	300
Lys Met Lys Asp Thr Asp Ser Glu Glu Glu Ile Arg Glu Ala Phe Arg			
305	310	315	320
Val Phe Asp Lys Asp Gly Asn Gly Tyr Ile Ser Ala Ala Gln Leu Arg			
	325	330	335
His Val Met Thr Asn Leu Gly Glu Lys Leu Thr Asp Glu Glu Val Asp			
	340	345	350
Glu Met Ile Arg Glu Ala Asp Ile Asp Gly Asp Gly Gln Val Asn Tyr			
	355	360	365
Glu Glu Phe Val Gln Met Met Thr Ala Lys Gly Gly Lys Arg Arg Trp			
	370	375	380
Lys Lys Asn Phe Ile Ala Val Ser Ala Ala Asn Arg Phe Lys Lys Ile			
385	390	395	400
Ser Ser Ser Gly Ala Leu Glu Leu Met Gln Lys Asn Gly Ile Lys Ala			
	405	410	415
Asn Phe Lys Ile Arg His Asn Ile Glu Asp Gly Gly Val Gln Leu Ala			
	420	425	430
Asp His Tyr Gln Gln Asn Thr Pro Ile Gly Asp Gly Pro Val Leu Leu			

435	440	445
Pro Asp Asn His Tyr Leu Ser Tyr Gln Ser Ala Leu Ser Lys Asp Pro		
450	455	460
Asn Glu Lys Arg Asp His Met Val Leu Leu Glu Phe Val Thr Ala Ala		
465	470	475
Gly Ile Thr Leu Gly Met Asp Glu Leu Tyr Lys Gly Gly Ser Gly Gly		
485	490	495
Met Val Ser Lys Gly Glu Glu Leu Phe Thr Gly Val Val Pro Ile Leu		
500	505	510
Val Glu Leu Asp Gly Asp Val Asn Gly His Lys Phe Ser Val Ser Gly		
515	520	525
Glu Gly Glu Gly Asp Ala Thr Tyr Gly Lys Leu Thr Leu Lys Leu Ile		
530	535	540
Cys Thr Thr Gly Lys Leu Pro Val Pro Trp Pro Thr Leu Val Thr Thr		
545	550	555
Leu Gly Tyr Gly Leu Gln Cys Phe Ala Arg Tyr Pro Asp His Met Lys		
565	570	575
Gln His Asp Phe Phe Lys Ser Ala Met Pro Glu Gly Tyr Val Gln Glu		
580	585	590
Arg Thr Ile Phe Phe Lys Asp Asp Gly Asn Tyr Lys Thr Arg Ala Glu		
595	600	605
Val Lys Phe Glu Gly Asp Thr Leu Val Asn Arg Ile Glu Leu Lys Gly		
610	615	620
Ile Asp Phe Lys Glu Asp Gly Asn Ile Leu Gly His Lys Leu Glu Tyr		
625	630	635
Asn Tyr Asn Ser His Asn Val Tyr Ile Thr Ala Asp Lys		
645	650	

<210> 44

<211> 653

<212> PRT

<213> Artificial Sequence

<400> 44

Met Val Ser Lys Gly Glu Glu Leu Phe Thr Gly Val Val Pro Ile Leu
1 5 10 15
Val Glu Leu Asp Gly Asp Val Asn Gly His Arg Phe Ser Val Ser Gly
20 25 30
Glu Gly Glu Gly Asp Ala Thr Tyr Gly Lys Leu Thr Leu Lys Phe Ile
35 40 45
Cys Thr Thr Gly Lys Leu Pro Val Pro Trp Pro Thr Leu Val Thr Thr
50 55 60
Leu Thr Trp Gly Val Gln Cys Phe Ser Arg Tyr Pro Asp His Met Lys
65 70 75 80
Gln His Asp Phe Phe Lys Ser Ala Met Pro Glu Gly Tyr Val Gln Glu
85 90 95
Arg Thr Ile Phe Phe Lys Asp Asp Gly Asn Tyr Lys Thr Arg Ala Glu
100 105 110
Val Lys Phe Glu Gly Asp Thr Leu Val Asn Arg Ile Glu Leu Lys Gly
115 120 125
Ile Asp Phe Lys Glu Asp Gly Asn Ile Leu Gly His Lys Leu Glu Tyr
130 135 140
Asn Tyr Ile Ser His Asn Val Tyr Ile Thr Ala Asp Lys Gln Lys Asn
145 150 155 160
Gly Ile Lys Ala Asn Phe Lys Ile Arg His Asn Ile Glu Asp Gly Ser
165 170 175

Val Gln Leu Ala Asp His Tyr Gln Gln Asn Thr Pro Ile Gly Asp Gly			
180	185	190	
Pro Val Leu Leu Pro Asp Asn His Tyr Leu Ser Thr Gln Ser Ala Leu			
195	200	205	
Ser Lys Asp Pro Lys Glu Lys Arg Asp His Met Val Leu Leu Glu Phe			
210	215	220	
Val Thr Ala Ala Arg Met His Asp Gln Leu Thr Glu Glu Gln Ile Ala			
225	230	235	240
Glu Phe Lys Glu Ala Phe Ser Leu Phe Asp Lys Asp Gly Asp Gly Thr			
245	250	255	
Ile Thr Thr Lys Glu Leu Gly Thr Val Met Arg Ser Leu Gly Gln Asn			
260	265	270	
Pro Thr Glu Ala Glu Leu Gln Asp Met Ile Asn Glu Val Asp Ala Asp			
275	280	285	
Gly Asn Gly Thr Ile Tyr Phe Pro Glu Phe Leu Thr Met Met Ala Arg			
290	295	300	
Lys Met Lys Asp Thr Asp Ser Glu Glu Glu Ile Arg Glu Ala Phe Arg			
305	310	315	320
Val Phe Asp Lys Asp Gly Asn Gly Tyr Ile Ser Ala Ala Gln Leu Arg			
325	330	335	
His Val Met Thr Asn Leu Gly Glu Lys Leu Thr Asp Glu Glu Val Asp			
340	345	350	
Glu Met Ile Arg Glu Ala Asp Ile Asp Gly Asp Gly Gln Val Asn Tyr			
355	360	365	
Glu Glu Phe Val Gln Met Met Thr Ala Lys Gly Gly Lys Arg Arg Trp			
370	375	380	
Lys Lys Asn Phe Ile Ala Val Ser Ala Ala Asn Arg Phe Lys Lys Ile			

385	390	395	400
Ser Ser Ser Gly Ala Leu Glu Leu Met Asp Gly Gly Val Gln Leu Ala			
	405	410	415
Asp His Tyr Gln Gln Asn Thr Pro Ile Gly Asp Gly Pro Val Leu Leu			
	420	425	430
Pro Asp Asn His Tyr Leu Ser Tyr Gln Ser Ala Leu Ser Lys Asp Pro			
	435	440	445
Asn Glu Lys Arg Asp His Met Val Leu Leu Glu Phe Val Thr Ala Ala			
	450	455	460
Gly Ile Thr Leu Gly Met Asp Glu Leu Tyr Lys Gly Gly Ser Gly Gly			
465	470	475	480
Met Val Ser Lys Gly Glu Glu Leu Phe Thr Gly Val Val Pro Ile Leu			
	485	490	495
Val Glu Leu Asp Gly Asp Val Asn Gly His Lys Phe Ser Val Ser Gly			
	500	505	510
Glu Gly Glu Gly Asp Ala Thr Tyr Gly Lys Leu Thr Leu Lys Leu Ile			
	515	520	525
Cys Thr Thr Gly Lys Leu Pro Val Pro Trp Pro Thr Leu Val Thr Thr			
	530	535	540
Leu Gly Tyr Gly Leu Gln Cys Phe Ala Arg Tyr Pro Asp His Met Lys			
545	550	555	560
Gln His Asp Phe Phe Lys Ser Ala Met Pro Glu Gly Tyr Val Gln Glu			
	565	570	575
Arg Thr Ile Phe Phe Lys Asp Asp Gly Asn Tyr Lys Thr Arg Ala Glu			
	580	585	590
Val Lys Phe Glu Gly Asp Thr Leu Val Asn Arg Ile Glu Leu Lys Gly			
	595	600	605

Ile Asp Phe Lys Glu Asp Gly Asn Ile Leu Gly His Lys Leu Glu Tyr
610 615 620

Asn Tyr Asn Ser His Asn Val Tyr Ile Thr Ala Asp Lys Gln Lys Asn
625 630 635 640

Gly Ile Lys Ala Asn Phe Lys Ile Arg His Asn Ile Glu
645 650

<210> 45

<211> 653

<212> PRT

<213> Artificial Sequence

<400> 45

Met Val Ser Lys Gly Glu Glu Leu Phe Thr Gly Val Val Pro Ile Leu
1 5 10 15

Val Glu Leu Asp Gly Asp Val Asn Gly His Arg Phe Ser Val Ser Gly
20 25 30

Glu Gly Glu Gly Asp Ala Thr Tyr Gly Lys Leu Thr Leu Lys Phe Ile
35 40 45

Cys Thr Thr Gly Lys Leu Pro Val Pro Trp Pro Thr Leu Val Thr Thr
50 55 60

Leu Thr Trp Gly Val Gln Cys Phe Ser Arg Tyr Pro Asp His Met Lys
65 70 75 80

Gln His Asp Phe Phe Lys Ser Ala Met Pro Glu Gly Tyr Val Gln Glu
85 90 95

Arg Thr Ile Phe Phe Lys Asp Asp Gly Asn Tyr Lys Thr Arg Ala Glu
100 105 110

Val Lys Phe Glu Gly Asp Thr Leu Val Asn Arg Ile Glu Leu Lys Gly
115 120 125

Ile Asp Phe Lys Glu Asp Gly Asn Ile Leu Gly His Lys Leu Glu Tyr			
130	135	140	
Asn Tyr Ile Ser His Asn Val Tyr Ile Thr Ala Asp Lys Gln Lys Asn			
145	150	155	160
Gly Ile Lys Ala Asn Phe Lys Ile Arg His Asn Ile Glu Asp Gly Ser			
165	170	175	
Val Gln Leu Ala Asp His Tyr Gln Gln Asn Thr Pro Ile Gly Asp Gly			
180	185	190	
Pro Val Leu Leu Pro Asp Asn His Tyr Leu Ser Thr Gln Ser Ala Leu			
195	200	205	
Ser Lys Asp Pro Lys Glu Lys Arg Asp His Met Val Leu Leu Glu Phe			
210	215	220	
Val Thr Ala Ala Arg Met His Asp Gln Leu Thr Glu Glu Gln Ile Ala			
225	230	235	240
Glu Phe Lys Glu Ala Phe Ser Leu Phe Asp Lys Asp Gly Asp Gly Thr			
245	250	255	
Ile Thr Thr Lys Glu Leu Gly Thr Val Met Arg Ser Leu Gly Gln Asn			
260	265	270	
Pro Thr Glu Ala Glu Leu Gln Asp Met Ile Asn Glu Val Asp Ala Asp			
275	280	285	
Gly Asn Gly Thr Ile Tyr Phe Pro Glu Phe Leu Thr Met Met Ala Arg			
290	295	300	
Lys Met Lys Asp Thr Asp Ser Glu Glu Glu Ile Arg Glu Ala Phe Arg			
305	310	315	320
Val Phe Asp Lys Asp Gly Asn Gly Tyr Ile Ser Ala Ala Gln Leu Arg			
325	330	335	
His Val Met Thr Asn Leu Gly Glu Lys Leu Thr Asp Glu Glu Val Asp			

340	345	350
Glu Met Ile Arg Glu Ala Asp Ile Asp Gly Asp Gly Gln Val Asn Tyr		
355	360	365
Glu Glu Phe Val Gln Met Met Thr Ala Lys Gly Gly Lys Arg Arg Trp		
370	375	380
Lys Lys Asn Phe Ile Ala Val Ser Ala Ala Asn Arg Phe Lys Lys Ile		
385	390	395
Ser Ser Ser Gly Ala Leu Glu Leu Met Leu Pro Asp Asn His Tyr Leu		
405	410	415
Ser Tyr Gln Ser Ala Leu Ser Lys Asp Pro Asn Glu Lys Arg Asp His		
420	425	430
Met Val Leu Leu Glu Phe Val Thr Ala Ala Gly Ile Thr Leu Gly Met		
435	440	445
Asp Glu Leu Tyr Lys Gly Gly Ser Gly Gly Met Val Ser Lys Gly Glu		
450	455	460
Glu Leu Phe Thr Gly Val Val Pro Ile Leu Val Glu Leu Asp Gly Asp		
465	470	475
Val Asn Gly His Lys Phe Ser Val Ser Gly Glu Gly Glu Gly Asp Ala		
485	490	495
Thr Tyr Gly Lys Leu Thr Leu Lys Leu Ile Cys Thr Thr Gly Lys Leu		
500	505	510
Pro Val Pro Trp Pro Thr Leu Val Thr Thr Leu Gly Tyr Gly Leu Gln		
515	520	525
Cys Phe Ala Arg Tyr Pro Asp His Met Lys Gln His Asp Phe Phe Lys		
530	535	540
Ser Ala Met Pro Glu Gly Tyr Val Gln Glu Arg Thr Ile Phe Phe Lys		
545	550	555
		560

Asp Asp Gly Asn Tyr Lys Thr Arg Ala Glu Val Lys Phe Glu Gly Asp
 565 570 575
 Thr Leu Val Asn Arg Ile Glu Leu Lys Gly Ile Asp Phe Lys Glu Asp
 580 585 590
 Gly Asn Ile Leu Gly His Lys Leu Glu Tyr Asn Tyr Asn Ser His Asn
 595 600 605
 Val Tyr Ile Thr Ala Asp Lys Gln Lys Asn Gly Ile Lys Ala Asn Phe
 610 615 620
 Lys Ile Arg His Asn Ile Glu Asp Gly Gly Val Gln Leu Ala Asp His
 625 630 635 640
 Tyr Gln Gln Asn Thr Pro Ile Gly Asp Gly Pro Val Leu
 645 650

<210> 46

<211> 653

<212> PRT

<213> Artificial Sequence

<400> 46

Met Val Ser Lys Gly Glu Glu Leu Phe Thr Gly Val Val Pro Ile Leu
 1 5 10 15
 Val Glu Leu Asp Gly Asp Val Asn Gly His Arg Phe Ser Val Ser Gly
 20 25 30
 Glu Gly Glu Gly Asp Ala Thr Tyr Gly Lys Leu Thr Leu Lys Phe Ile
 35 40 45
 Cys Thr Thr Gly Lys Leu Pro Val Pro Trp Pro Thr Leu Val Thr Thr
 50 55 60
 Leu Thr Trp Gly Val Gln Cys Phe Ser Arg Tyr Pro Asp His Met Lys
 65 70 75 80

Gln His Asp Phe Phe Lys Ser Ala Met Pro Glu Gly Tyr Val Gln Glu			
	85	90	95
Arg Thr Ile Phe Phe Lys Asp Asp Gly Asn Tyr Lys Thr Arg Ala Glu			
	100	105	110
Val Lys Phe Glu Gly Asp Thr Leu Val Asn Arg Ile Glu Leu Lys Gly			
	115	120	125
Ile Asp Phe Lys Glu Asp Gly Asn Ile Leu Gly His Lys Leu Glu Tyr			
	130	135	140
Asn Tyr Ile Ser His Asn Val Tyr Ile Thr Ala Asp Lys Gln Lys Asn			
	145	150	155
Gly Ile Lys Ala Asn Phe Lys Ile Arg His Asn Ile Glu Asp Gly Ser			
	165	170	175
Val Gln Leu Ala Asp His Tyr Gln Gln Asn Thr Pro Ile Gly Asp Gly			
	180	185	190
Pro Val Leu Leu Pro Asp Asn His Tyr Leu Ser Thr Gln Ser Ala Leu			
	195	200	205
Ser Lys Asp Pro Lys Glu Lys Arg Asp His Met Val Leu Leu Glu Phe			
	210	215	220
Val Thr Ala Ala Arg Met His Asp Gln Leu Thr Glu Glu Gln Ile Ala			
	225	230	235
Glu Phe Lys Glu Ala Phe Ser Leu Phe Asp Lys Asp Gly Asp Gly Thr			
	245	250	255
Ile Thr Thr Lys Glu Leu Gly Thr Val Met Arg Ser Leu Gly Gln Asn			
	260	265	270
Pro Thr Glu Ala Glu Leu Gln Asp Met Ile Asn Glu Val Asp Ala Asp			
	275	280	285
Gly Asn Gly Thr Ile Tyr Phe Pro Glu Phe Leu Thr Met Met Ala Arg			

290	295	300	
Lys Met Lys Asp Thr Asp Ser Glu Glu Glu Ile Arg Glu Ala Phe Arg			
305	310	315	320
Val Phe Asp Lys Asp Gly Asn Gly Tyr Ile Ser Ala Ala Gln Leu Arg			
	325	330	335
His Val Met Thr Asn Leu Gly Glu Lys Leu Thr Asp Glu Glu Val Asp			
	340	345	350
Glu Met Ile Arg Glu Ala Asp Ile Asp Gly Asp Gly Gln Val Asn Tyr			
	355	360	365
Glu Glu Phe Val Gln Met Met Thr Ala Lys Gly Gly Lys Arg Arg Trp			
	370	375	380
Lys Lys Asn Phe Ile Ala Val Ser Ala Ala Asn Arg Phe Lys Lys Ile			
385	390	395	400
Ser Ser Ser Gly Ala Leu Glu Leu Met Ile Thr Leu Gly Met Asp Glu			
	405	410	415
Leu Tyr Lys Gly Gly Ser Gly Gly Met Val Ser Lys Gly Glu Glu Leu			
	420	425	430
Phe Thr Gly Val Val Pro Ile Leu Val Glu Leu Asp Gly Asp Val Asn			
	435	440	445
Gly His Lys Phe Ser Val Ser Gly Glu Gly Glu Gly Asp Ala Thr Tyr			
	450	455	460
Gly Lys Leu Thr Leu Lys Leu Ile Cys Thr Thr Gly Lys Leu Pro Val			
465	470	475	480
Pro Trp Pro Thr Leu Val Thr Thr Leu Gly Tyr Gly Leu Gln Cys Phe			
	485	490	495
Ala Arg Tyr Pro Asp His Met Lys Gln His Asp Phe Phe Lys Ser Ala			
	500	505	510

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